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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/771,152	02/04/2004	Ravi B. Gopal	9351-382	9104

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BERESKIN AND PARR
40 KING STREET WEST
BOX 401
TORONTO, ON M5H 3Y2
CANADA

EXAMINER	
BERHANU, SAMUEL	
ART UNIT	PAPER NUMBER
2838	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/771,152	GOPAL, RAVI B.	
	Examiner	Art Unit	
	Samuel Berhanu	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *4/18/2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6,8-13,15,17,18,20-25 and 27-32* is/are pending in the application.

4a) Of the above claim(s) *14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,8-13,15,17,18,20-25 and 27-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 November 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *01/25/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 3-6, 8-13, 15, 20-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Claims 3-6, 8-13, 15, 20-25 depend on a canceled claims, i.e. claims 2 and 19. It is improper for a claim to depend on a canceled claim. For examination purpose it is assumed that Claims 3-6, 8 and 15 are dependent on Claim 1, and Claims 20-22 are dependent on Claim 17. Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S.

patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. Claims 1, 3-5, 15, 17-18, 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al. (US 6,519,539)

Regarding Claims 1 and 17, Freeman et al. disclose in Figure 1,an electrochemical system comprising a plurality of cells (90, Column 5, lines 31-32); a measuring device (120,130) including a plurality of inputs connected across the plurality of cells to generate voltage and current signals indicative of voltage and current characteristics of the plurality of cells (Column 5, lines 52-56); a current supply/draw means (100) for superimposing modulated current values through the plurality of cells (Column 5, lines 47-51, Column 3, lines 65-67, Column 4, lines 38-32) wherein the current supply/draw means comprises a modulator, the modulator being arranged to superimpose the modulated current values in bust time for high frequency resistance measurement, with time periods between burst time periods of no superimposition of modulated current values (noted that the burst time can be met by the time in which Ac wave form is applied on the cells, and non burst time period is also met by the time periods in which the AC wave form is not applied on the cells); and, a controller (10, 20) for controlling at least one system, operating condition based on the voltage and current characteristics received from the measuring device, the controller being connected to the measuring device (Column 5, lines 45-47).

Regarding Claim 3, Freeman et al. disclose, the modulator is an integral part of the controller (Column 5, lines 52-56).

Regarding Claim 4, Freeman et al. disclose in Figures 1, the plurality of inputs are connected across individual cells in the plurality of cells and the modulator is operable to superimpose modulated current values through the individual cells (Column 5, lines 31-56).

Regarding Claim 5, Freeman et al. disclose in Figure 1, the controller is operable to control, in real time, the at least one system operating condition based on the voltage and current characteristics received from the measuring device (Column 6, lines 46-56))

Regarding Claim 15, Freeman et al. disclose in Figure 1, wherein the controller includes an input (60), connectable to a computing device (20) for supply of control signals for controlling the controller.

Regarding Claim 18, Freeman et al. disclose a method (a) comprises superimposing the modulated current values across individual cells in the plurality of cells; and step (b) comprises drawing current from the individual cells to generate voltage and current signals indicative of voltage and current characteristics of the individual cells (Column 2, lines 31-56)

Regarding Claim 20, Freeman et al. disclose wherein step (a) comprises controlling the superimposing to provide a series of set interference conditions, and measuring, for each interference condition, at least some of the voltage and current characteristics of the electrochemical device (Column 6, lines 46-65).

Regarding Claim 21, Freeman et al. disclose, a method wherein step (a) comprises varying a frequency of the superimposed current values; step (b) comprises generating the voltage and current signals at selected frequencies for the superimposed modulated current values, and determining from the voltage and current signals a plurality of real and imaginary components of the impedance of the individual cells; and, step (c) comprises controlling the at least one system operating condition based on the plurality of real and imaginary components of the impedance of the individual cells (Column 3, lines 57-67, Column 4, lines 1-39).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al. in view Dunn et al (US 6,239,579).

Regarding Claim 6, neither Freeman et al. does not disclose the controller is operable to alert an operator based on alarm conditions determined from the voltage and current characteristics received from the measuring device. However, Dunn et al. discloses a controller is operable to alert an operator based on alarm conditions determined from the voltage and current characteristics received from the measuring device (Column 7, lines 18). It

would have been obvious to a person having ordinary skill in the art at the time of the invention to modify Freeman et al device and add a monitoring circuit as taught by Dunn et al. in order to effectively monitor battery status.

8. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al. in view of Stader et al. (US 4,916,734).

Regarding Claim 8, Freeman et al. disclose in Figure 1, the measuring device provides a plurality of primary channels (120,130) for the measured voltage (120) and current signals (130), there being one channel for the voltage across each cell. However, r Freeman et al. does not discloses the measuring device includes a splitter for separating out at least the DC components of the voltages across the individual cells from the primary channels, the splitter having first channels as outputs for the DC components Stader et a. disclose in Figures 1 and 2, the measuring device includes a splitter for separating out at least the DC components of the voltages across the individual cells from the primary channels, the splitter having first channels as outputs for the DC (Column 2, lines 19-68). It would have been obvious to a person having ordinary skill in the art at the time of the invention to add an AC and DC current separating means circuit as taught by Stader et al. in order to measure only the desired signal of interest.

Regarding Claim 9, Freeman et al. disclose in Figure 1, wherein the splitter includes second channels (130) as outputs for the AC components of the voltages across the individual cells.

9. Claims 10-13 and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Freeman et al. in view of Stader et al. as applied to claim 8 above, and further in view of Bisher (US 5,416,416).

Regarding Claims 10 and 23, Freeman et al., and Stader et al. don't disclose explicitly, an analog multiplexer connected to at least the first channels from the channel splitter, wherein a multiplexer control line is connected between the controller and the analog multiplexer for controlling the analog multiplexer to switch sequentially between at least the first channels. However, Bisher discloses in Figure 9 an analog multiplexer (357) connected to at least the first channels from the channel splitter, wherein a multiplexer control line is connected between the controller and the analog multiplexer for controlling the analog multiplexer to switch sequentially between at least the first channels. It would have been obvious to a person having ordinary skill in the art at the time of the invention to add a multiplexer in Freeman et al. device as taught by Bisher in order to obtain the desired signal of interest.

Regarding Claim 11, Freeman et al. disclose, a first analog to digital converter (70) connected to the output of the analog multiplexer, a voltage data bus (60, ch1) connected between the first analog to digital converter and the controller and an analog to digital control line connected between the controller and the first analog to digital converter for control thereof (Column 5, lines 57-67)

Regarding Claim 12, Freeman et al. disclose, a current sensing device (110) is provided connected in series with the individual cells for measuring the current,

wherein the current sensing device is connected to the controller (130).

Regarding Claim 13, Freeman et al. disclose, the current sensing device (110) are connected to a current amplifier (130) and wherein the current amplifier has an output for a current measurement signal connected to the controller (ch2).

Regarding Claim 22, Freeman et al. disclose, wherein step (b) comprises connecting inputs of a plurality of differential amplifiers across individual cells of the electrochemical device, measuring the voltage and current of the cells with the plurality of differential amplifiers to generate the voltage and current signals. Freeman et. al. do not disclose explicitly, supplying the voltage and current signals to a multiplexer and operating the multiplexer to sequentially supply the voltage and current signals to a controller for performing step (c). Bisher discloses supplying the voltage and current signals to a multiplexer and operating the multiplexer to sequentially supply the voltage and current signals to a controller for performing step (c) (see claims 10 and 23 rejection above).

Regarding Claim 24, Freeman et al. disclose, providing a current sensing device (130) connected in series with the cells for measuring the current through the load, measuring the voltage across the current sensing device to determine the current through the Load and thereby generating a current measurement signal, and supplying the current measurement signal to the controller (ch2).

Regarding Claim 25, Freeman et al. disclose, converting the current measurement signal to a digital current measurement signal, and supplying the digital current measurement signal to the controller (Column 4, lines 57-67).

10. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freeman et al. in view of Stader et al. (US 4,916,734).

Regarding Claim 27, Freeman et al. disclose in Figure 1, an electrochemical system comprising a plurality of cells (90, Column 5, lines 31-32); a measuring device (120,130) including a plurality of inputs connected across the plurality of cells to generate voltage and current signals indicative of voltage and current characteristics of the plurality of cells (Column 5, lines 52-56); wherein the measuring device comprises a modulator (70) and provides a plurality of primary channels (120,130) for the measured voltage (120) and current signals (130) there being one channel for the voltage across each cell current supply/draw means (100) for superimposing modulated current values through the plurality of cells (Column 5, lines 47-51, Column 3, lines 65-67, Column 4, lines 38-32) and, a controller (10, 20) for controlling at least one system, operating condition based on the voltage and current characteristics received from the measuring device, the controller being connected to the measuring device (Column 5, lines 45-47). Freeman et. al. does not disclose explicitly, the measuring device includes a splitter for separating out at least the DC components of the voltages across the individual cells from the primary channels, the splitter having first channels as outputs for the DC components. Stader et al. discloses in Figures 1 and 2, the measuring device includes a

splitter for separating out at least the DC components of the voltages across the individual cells from the primary channels, the splitter having first channels as outputs for the DC (Column 2, lines 19-68). It would have been obvious to a person having ordinary skill in the art at the time of the invention to add an AC and DC current separating means circuit as taught by Stader et al. in order to measure only the desired signal of interest.

Regarding Claim 28, Freeman et al. disclose in Figure 1, wherein the splitter includes second channels (130) as outputs for the AC components of the voltages across the individual cells.

11. Claims 29-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over unpatentable over Freeman et al. in view of Stader et al. as applied to claim 27 above, and further in view of Bisher (US 5,416,416).

Regarding Claim 29, Freeman et al., and Stader et al. don't disclose explicitly, an analog multiplexer connected to at least the first channels from the channel splitter, wherein a multiplexer control line is connected between the controller and the analog multiplexer for controlling the analog multiplexer to switch sequentially between at least the first channels. However, Bisher discloses in Figure 9 an analog multiplexer (357) connected to at least the first channels from the channel splitter, wherein a multiplexer control line is connected between the controller and the analog multiplexer for controlling the analog multiplexer to switch sequentially between at least the first channels. It would have been obvious to a person having ordinary skill in the art at the time of the invention to add a multiplexer in Freeman et al. device as taught by

Bisher in order to obtain the desired signal of interest.

Regarding Claim 30, Freeman et al. disclose, a first analog to digital converter (70) connected to the output of the analog multiplexer, a voltage data bus (60, ch1) connected between the first analog to digital converter and the controller and an analog to digital control line connected between the controller and the first analog to digital converter for control thereof (Column 5, lines 57-67)

Regarding Claim 31 Freeman et al. disclose, a current sensing device (110) is provided connected in series with the individual cells for measuring the current, wherein the current sensing device is connected to the controller (130).

Regarding Claim 32, Freeman et al. disclose, the current sensing device (110) are connected to a current amplifier (130) and wherein the current amplifier has an output for a current measurement signal connected to the controller (ch2).

Response to Arguments

12. Applicant's arguments filed 04/18/2007 have been fully considered but they are not persuasive.

Applicant is arguing that no teaching or suggestion in Freeman et. al. superimposing modulated current values across a plurality of cells in burst time periods. With time periods between the burst time periods of no superimposition of modulated current values. This is incorrect.

Freeman et. al. discloses Applying AC waveform across the fuel cells. The time in which AC waveform is applied across the fuel cells can be called as "a burst time periods" and the non testing period where no AC waveform is applied across the fuel cell can be called as "non burst time periods".

13. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Stader et. al. discloses, an apparatus for separating a dc current and ac current components of a composite signal (See col. 2, lines 19-21). Therefore it would have been obvious to combine Stader's apparatus to any measuring device such that ac current components of high amplitudes are not distorted

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel Berhanu whose telephone number is 571-272-8430. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karl Easthom can be reached on 571-272-1989. The fax

phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SB

BAO Q. VU
PRIMARY EXAMINER